Objective

The visual aspect of ceremony cakes is one of the key factors directly impacting consumers' choice.
This study proposes to assess apples being treated by different processes with IRIS visual analyzer.

IRIS Electronic Eye

IRIS analyzer achieves a detailed visual assessment of both color and shape parameters of the overall products or selected portions of these products.

Camera imaging

- 16 million colors imaging
- Integrated zoom
- Automated monitoring by software

Light cabin

- Reproducible lighting conditions, D65 compliant, 6700°K color temperature
- Top and bottom lighting (backlighting to avoid shadow effects)
- Large measurement surface (420 x 560mm)

E-Eye Alphasoft software

- Data acquisition
- Automated color calibration
- Data processing (color and shape analysis)
- Multivariate Statistics (Principal Components Analysis, Statistical Quality Control, etc).

Figure 1: IRIS Electronic Eye

Samples & Analytical Method

Eight cakes were evaluated with IRIS instrument: 5 with satisfactory appearance, 1 with satisfactory appearance but cracked and 2 with unsatisfactory appearance. A picture of the top surface of each cake was taken (fig. 2).

Figure 2: Picture of cakes top surface: satisfactory aspect (left) and unsatisfactory aspect (right)

Each picture was processed as a color spectrum (fig. 3). The full color spectrum of each picture represents the proportion (percentage of surface) of each unique color (i.e. unique combination of RGB values) measured in a 4096 color space.

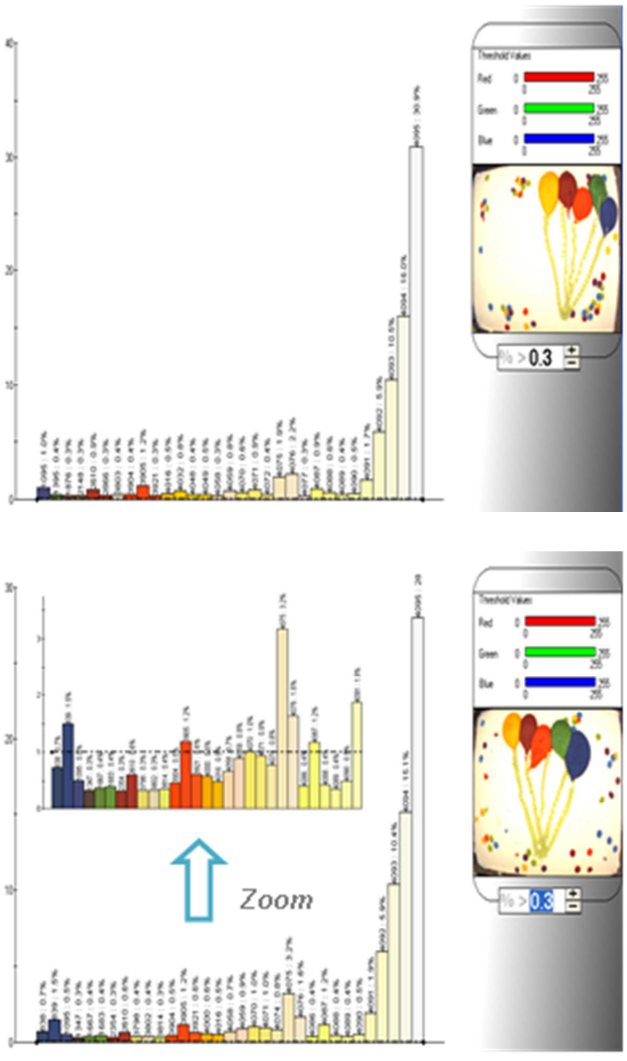

Figure 3: Color spectrum of cakes top surface: satisfactory aspect (top) and unsatisfactory aspect (bottom)

The comparison of the color spectrum shows that the proportion of blue (color code 839) and white cream color (color code 4075) is higher in unacceptable cakes, whereas the proportion of light pink (color code 4076) is higher in acceptable cakes.

Global Color Analysis

With IRIS electronic eye, it is possible to analyze colors globally on the whole surface of the cakes, in one acquisition.

To rapidly compare the overall appearance of cakes surface, the color spectrum data are processed by Principal Components Analysis (fig. 4).

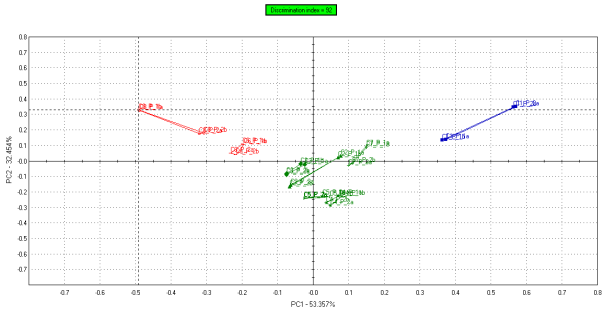

Figure 4: Principal Components Analysis of the visual aspect of cakes surface

The differences can be linked with the proportion of individual colors from the color spectrum (fig. 5).

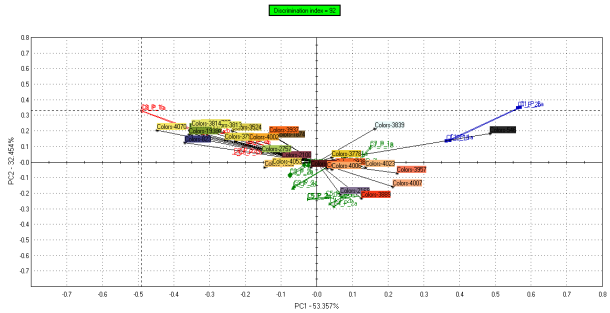

Figure 5: Principal Components Analysis of the visual aspect of cakes surface, with

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Conclusion

This study suggests that IRIS visual analyzer can be used to rapidly and objectively determine the conformity of the global visual aspect of complex products such as the topping of ceremony cakes.